

Chen et al.  
U.S.S.N. 09/454,316  
Page 2

20. (amended) A method for preparing the catalyst according to claim 1, which comprises: (a) impregnating a porous carrier with a solution containing palladium, gold, and tin in oxidative states, then reducing the metals from an oxidative state into metallic state; (b) impregnating said metallic state metals-supporting carrier with a solution of alkali or alkaline earth metal compounds, then drying it.

### REMARKS

Claims 1, 4, 6, 8-10, 14-16, and 20-22 are pending in this application. Claim 1 and 20 have been amended. No new matter has been introduced by virtue of the amendments made to the claims. For instance, support for the amended claims appears in Table 1 in the specification, in Examples 1 and 4, and at page 3, line 23 of the specification.

Claims 1, 4, 6, 8-10, and 14-16 were rejected under 35 U.S.C. §102(b) over Bartsch (U.S. Patent 4,158,737).

Claims 20 and 21 were rejected under 35 U.S.C. §103(a) over Bartsch (U.S. Patent 4,158,737) in view of Sennewald (U.S. Patent 3,655,747).

Claim 22 was rejected under 35 U.S.C. §103(a) over Bartsch (U.S. Patent 4,158,737) and Sennewald (U.S. Patent 3,655,747) and further in view of Kronig et al. (U.S. Patent 3,822, 308).

For the sake of brevity, the three § 102 and § 103 rejections are addressed in combination. Such a combined response is considered appropriate because *inter alia* each of the rejections relies on the Bartsch patent as the sole or primary citation. Each of the rejections is traversed.

The Examiner appears to take the position that 85-99.9 % of the catalyst by weight may be other metals. This assertion is not true. As provided by claim 1, the total weight of palladium is 0.1 to 5.0 %, the total weight of tin is 0.01 to 5.0%, and the total combined weight of gold and tin is 0.01 to 5.0 % where *the weight percent of palladium and tin and the aggregate weight*



Chen et al.  
U.S.S.N. 09/454,316  
Page 3

*percent of tin and gold is calculated based on the weight of the porous carrier.* For example, a porous catalyst having 5% by weight palladium corresponds to 1 part by weight palladium deposited on 20 parts by weight of a porous substrate. Moreover, as provided by claim 1 oxacylation catalysts of the invention exclude transition metals other than palladium, tin and gold. Clearly then, it would not be possible for catalysts of the invention to include 85-99.8% of other metals by weight.

The present invention provides supported oxacylation catalysts in which a mixture of palladium, gold and tin are deposited together with an alkali metal compound on a porous carrier. The oxacylation catalysts of the invention have 0.1 – 5.0 % by weight of palladium and 0.1 – 5.0 % by weight of gold and tin taken in combination *based on the weight of said porous carrier.* Oxacylation catalysts of the invention do not contain additional transition metals.

Applicants select specific supported oxacylation catalysts having metallic palladium, gold and tin deposited on a porous carrier with an alkali metal compound where other transition metals are excluded from the catalyst. The oxacylation catalysts of the invention exhibit superior catalyst activity and durability as compared to prior art catalysts when the concentration of water in the reactant stream is reduced.

In contrast, the activity of conventional catalysts deteriorate rapidly when water is not added during the oxacylation process. See, for example, page 2, line 12-22. Therefore, the energy consumed and wasted resulting from the addition of water can be avoided by using the catalyst of the present invention, and the economical effect of the oxacylation process can be greatly increased.

Applicants have surprisingly discovered that the specific supported oxacylation catalysts of the invention in which a mixture of metallic palladium, gold and tin are deposited on a porous carrier with an alkali metal compound in the absence of other transition metals exhibit superior catalytic activity and durability compared to prior art catalysts. Moreover the oxacylation catalysts of the invention maintain substantially the same catalytic activity and catalyst lifetime



Chen et al.  
U.S.S.N. 09/454,316  
Page 4

when the concentration of water in the reactant stream is similar to the water concentration necessary for the prior art catalysts and when concentration of water in the reactant stream is reduced. See for example, page 5, line 7-19. Moreover, the oxacylation catalysts of the invention may be used in the process for producing allyl acetate even when water is not added to the reactant stream during the oxacylation process. See, for example, pages 7 to 12 of the application including the Table on page 11.

In contrast, Bartsch teaches supported catalysts of palladium metal and an alkali metal acetate on an support. Bartsch further teaches that palladium catalyst composition may further contain other metals and recites a list of potential metal additives which could be suitable for the preparation of supported palladium catalysts disclosed therein. The Bartsch disclosure merely recites catalysts containing only palladium metal or a mixture of palladium and gold metal. Bartsch neither discloses nor suggest catalysts having three metal elements deposited onto a porous substrate nor does Bartsch teach or suggest a porous catalyst of palladium, tin and gold. Moreover, it is not clear whether Bartsch actually prepared supported palladium catalysts having a mixture of metals other than palladium and gold.

Thus Bartsch did not disclose either the specifically claimed oxacylation catalysts having a mixture of palladium, gold and tin excluding other transition metals, nor the useful industrial properties thereof.

As provided in MPEP-2131, a claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. *Verdegal Bros. v. Union Oil Co. of California*, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). Or stated another way, "The identical invention must be shown in as complete detail as is contained in the ... claims". *Richardson v Suzuki Motor Co.*, 868 F.2d 1226, 9 USPQ 2d. 1913, 1920 (Fed. Cir. 1989). Although identify of terminology is not required, the elements must be arranged as required by the claim. *In re Bond*, 15 USPQ2d 1566 (Fed. Cir. 1990). It is readily apparent that the requirements of § 102 of the statute are not met with regard to the claimed



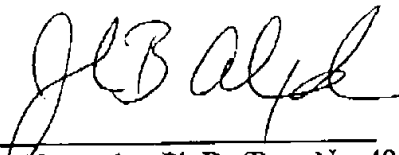
Chen et al.  
U.S.S.N. 09/454,316  
Page 5

subject matter by the Bischof reference. Reconsideration and withdrawal of the rejection are earnestly solicited.

The disclosures of Sennewald and Kronig fail to overcome the limitations of the Bartsch disclosures. Sennewald merely recites a method of reductive deposition of metals onto a particle surface using hydrazine as the reductant. Kronig teaches the use of ethylene gas at elevated temperature to reduce a mixture of palladium and gold salts to metallic palladium and gold. The disclosures of Sennewald and Kronig are not sufficient to overcome the limitations of Bartsch.

It is believed the application is in condition for immediate allowance, which action is earnestly solicited.

Respectfully submitted,



Date: April 22, 2002

John B. Alexander, Ph.D. (Reg. No. 48,399)  
Dike Bronstein, Roberts & Cushman  
Intellectual Property Practice Group  
EDWARDS & ANGELL, LLP  
P.O. Box 9169  
Boston, MA 02209  
(617) 439-4444

BOS2 298943.1



Chen et al.  
U.S.S.N. 09/454,316  
Page 6

VERSION WITH MARKINGS TO SHOW CHANGES MADE  
(Additions are underlined and deletions are bracketed)

IN THE CLAIMS

1. (thrice amended) A catalyst for oxacylation to produce allyl acetate, which comprises 0.1 to 5.0 weight % of palladium metal as the main catalyst, gold metal, and 0.01 to 5.0 weight % of tin metal as the promoter, based on the weight of said porous carrier, in combination with an alkali metal compound, supported on the outer surface of a porous carrier, wherein the total content of gold metal and tin metal is in the range of 0.01 to 5.0 weight %, with the proviso that the catalyst excludes transition metals other than palladium, tin and gold.

20. (amended) A method for preparing the catalyst according to claim 1, which comprises: (a) impregnating a porous carrier with a solution containing palladium, gold, and [promoter metal(s)] tin in oxidative states, then reducing the metals from an oxidative state into metallic state; (b) impregnating said metallic state metals-supporting carrier with a solution of alkali or alkaline earth metal compounds, then drying it.